

NCR → 7<sup>th</sup> page →

# Work Order ID 109972

\*109972\*

Page 1

December-11-13 8:34:05 AM

Item ID: D4909-1 Accept \*N900040100\* Setup Start \*NS1\*  
 Revision ID: Stop \*NS2\*  
 Item Name: Support  
 Start Date: 12/12/2013 Start Qty: 6.00 \*6\* Cust Item ID:  
 Required Date: 18/12/2013 Req'd Qty: 6.00 \*6\* Customer:  
 Reference: *13-12-11*

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start \*NR1\*  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D4909	A								

100 0.00  
 \*100\* HAAS CNC VERTICAL MACHINING #1  
 HAAS 1 Memo  
 HAAS CNC vertical machine #1 Machine as per Folio FB209  
 Folio Rev: AA  
 Dwg Rev: A  
 Debur  
 \*\*\*\*Program Batch #\*\*\*\*\*  
 110 0.00  
 \*110\* QC2- Inspect parts off machine FAI/FAIB  
 QC Memo  
 Quality Control

*B.A 13/12/16 6 0 13-12-17*

*B.A 13/12/16 6 0 13-12-17*

# Work Order ID 109972

December-11-13 8:34:05 AM

\*109972\*

Page 2

Item ID: D4909-1 Accept \*N900040100\* Setup Start \*NS1\*  
 Revision ID: Stop \*NS2\*  
 Item Name: Support  
 Start Date: 12/12/2013 Start Qty: 6.00 \*6\* Cust Item ID:  
 Required Date: 18/12/2013 Req'd Qty: 6.00 \*6\* Customer:  
 Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_ Run Start \*NR1\*  
 QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_ Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120	QC8- Inspect parts - second check	0.00							
*120*									
QC	Memo	0.00							
Quality Control									
130	Identify as per dwg & Stock Location: <u>LC</u>	0.00							
*130*									
Packaging	Memo	0.00							
Packaging									
140	QC21- Final Inspection - Work Order Release	0.00							
*140*									
QC	Memo	0.00							
Quality Control									

S 10 13-12-20

→  
PTO

Sx 14-1-8 DAS 26 9-89

14-01-8

14-01-8



# Picklist Print

December-11-13 8:34:03 AM

Page 1

Work Order ID: 109972

Parent Item: D4909-1

Parent Item Name: Support

Start Date: 12/12/2013

Required Date: 18/12/2013

Start Qty: 6.00

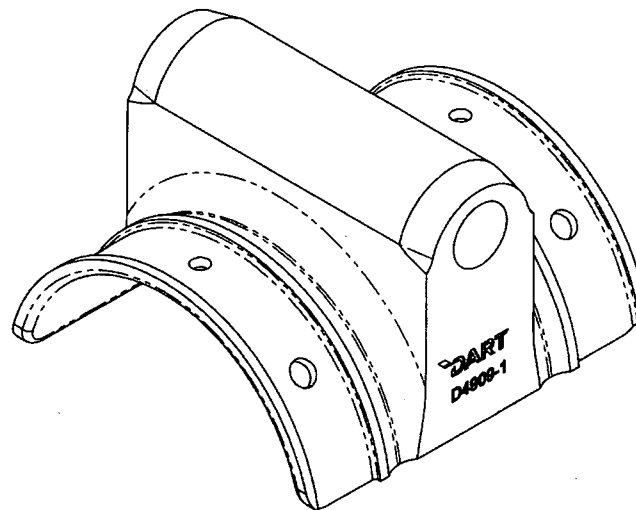
Required Qty: 6.00

Comments: IPP REV:A NEW ISSUE 13-04-24 JLM VERIFIED BY:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D4909-1TRN Support		Manufactured	No			100	Each	0.0000	1	6		13/12/16	

→ M 109971

3



**D4909-1 SUPPORT**

**NOTES:**

- 1) MATERIAL: MAKE FROM D4909-1TRN
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: IDENTIFY WITH DART LOGO AND P/N "D4909-1" IN INDICATED AREA  
USING 0.125 HIGH X 0.010-0.020 DEEP LETTERING PER DART QSI 044 6.3,  
IDENTIFY WITH DART B/N PER DART QSI 044 6.1
- 7) WEIGHT: 1.90 lbs

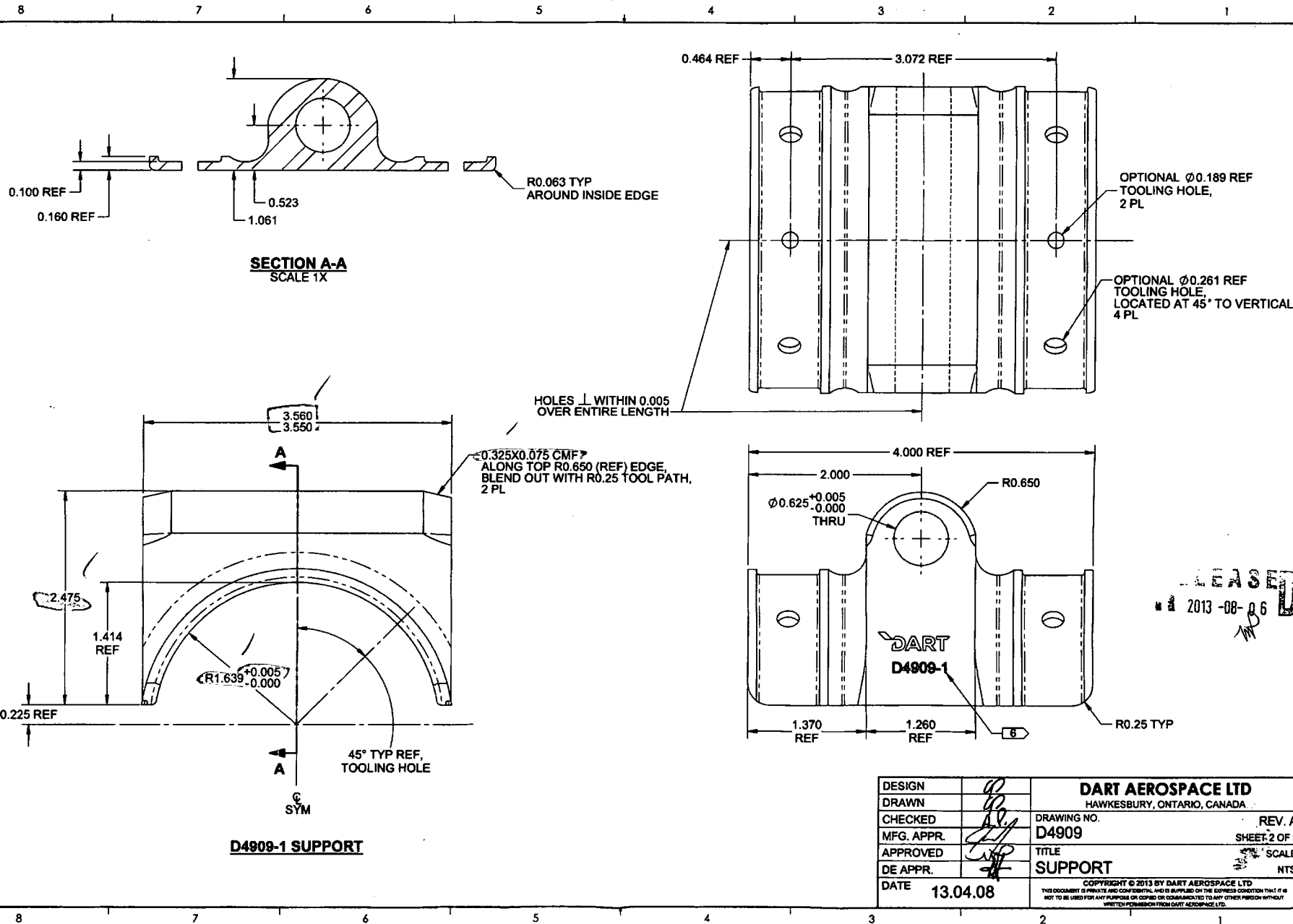
109972

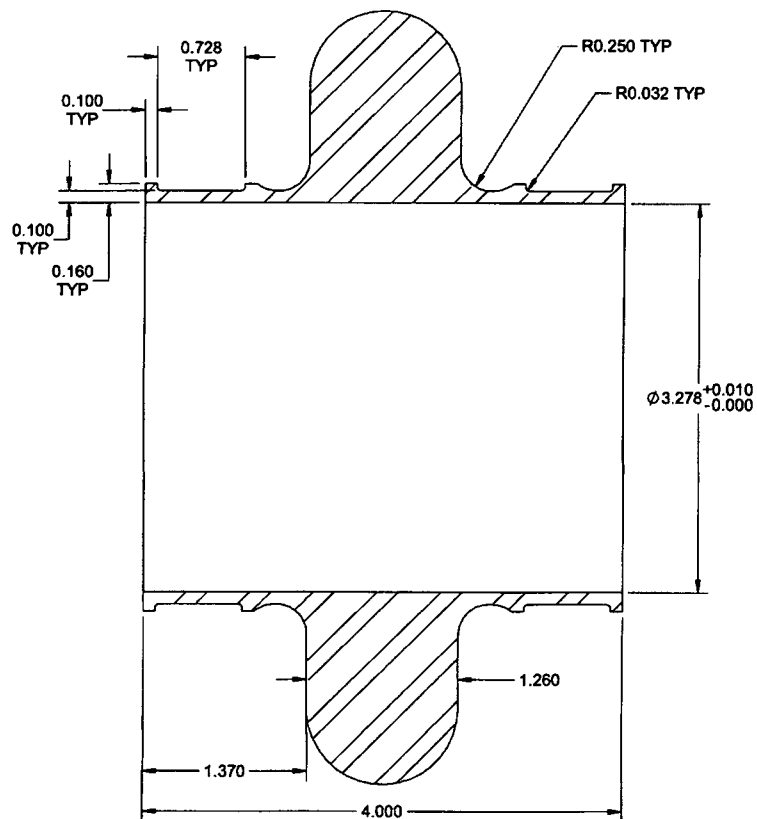
**RELEASED**  
2013-08-06  
WJ

A	NEW ISSUE	CP	13.04.08
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	13.04.08		

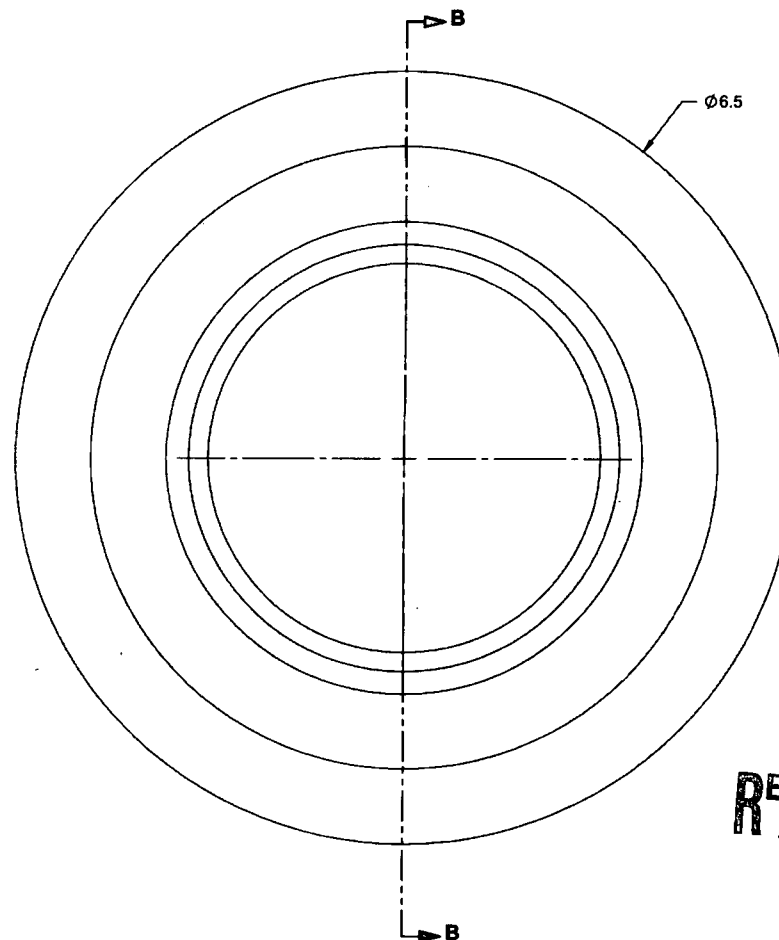
  

<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. <b>D4909</b>	REV. A
TITLE <b>SUPPORT</b>	SCALE NTS
<small>COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMBINED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	





**SECTION B-B**



**D4909-1TRN TURNING DETAIL**

**NOTES:**

- 1) MATERIAL: 17-4PH / S17400 / TYPE 630 ROUND BAR PER AMS 5643 / ASTM A564, REF DART SPEC. M17-4-R  
HEAT TREAT TO H900 CONDITION (900 °F FOR 1 HR, AIR COOL)  
MIN UTS = 170 KSI (38 HRC)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: 9.1 lbs

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		<b>D4909</b>	SHEET 3 OF 3
APPROVED		TITLE	SCALE
DE APPR.		<b>SUPPORT</b>	NTS
DATE	<b>13.04.08</b>	<small>COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

**RELEASED**  
2013-08-06

*w/o 109972*

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 109972
<b>Description:</b> Support		<b>Part Number:</b> D4909-1
<b>Inspection Dwg:</b> D4909	<b>Rev:</b> A	<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

Drawing Dimension	Tolerance	Actual ① Dimension	② Accept	③ Reject	④ Method of Inspection	⑤ Comments	⑥
2.475	$\pm .010$	2.475	2.475	2.473	2.474	2.473	2.475
3.555	$\pm .005$	3.553	3.553	3.554	3.554	3.551	3.551
R1.639	$\pm .005$	1.640	1.640	1.639	1.639		
325X.075	$\pm .010$	325X.075	325X.075	325X.075	325X.075	325X.075	325X.075
Ø.625	$\pm .005$	.626	.626	.626	.626	.626	.626
2.000	$\pm .010$	2.000	2.001	1.997	1.997	2.003	2.003
5.25	$\pm .030$	2.50	2.50	2.50	2.50	2.50	2.50
4.							
1.061	$\pm .010$	1.058	1.058	1.052	1.051	1.056	1.055
.523	$\pm .010$	.520	.520	.519	.519	.518	.518
5.063	$\pm .010$	.063	.063	.063	.063	.063	.063
6.25 hole 1	.005 over length	.0015	.002	0	.0015	.0015	.002

<b>Measured by:</b> SL	<b>Audited by:</b> [Signature]	<b>Preliminary Approval:</b>
<b>Date:</b> 13-12-17	<b>Date:</b> 13-12-20	<b>Date:</b>

Rev	Date	Change	Revised by	Approved
E	10.04.14	Added preliminary approval	KJ	

10.04.15



NCR: Yes / No

# Pink NCR # 14-3412 WORK ORDER NON-CONFORMANCE / UPDATE

DQA: John Date: 14/01/21QA Closed: JA Date: 14/01/10

Work Order: <u>109972</u>	<b>DISPOSITION</b> Rework <input type="checkbox"/> Scrap <input checked="" type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	<b>AGAINST DEPARTMENT/PROCESS</b>			
Part No: <u>D4909-1</u>		Skid-tube <input type="checkbox"/> Machining <input type="checkbox"/> Thermoforming <input type="checkbox"/> Large Fab <input type="checkbox"/>	Crosstube <input type="checkbox"/> Small Fab <input type="checkbox"/> Finishing <input type="checkbox"/> Composite <input type="checkbox"/>	Water Jet <input type="checkbox"/> Prod. Eng. Coord. <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/> Supplier <input checked="" type="checkbox"/>	Engineering <input type="checkbox"/> Quality <input type="checkbox"/> Other <input type="checkbox"/>
NCR No: <u>14-3403</u>					

Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data	13/12/20	100	1	MAT'L DEFECT IN RAW MAT'L,  MAT'L PO 21461  \$352.16	DAS 12 9-89  13/12/20	SCRAP ⇒ USE FOR ENG TEST RD4388A	DAS 12 9-89  13/12/20	DAS 16 9-89  14/01/07	DAS 16 9-89  14/01/07		
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											

## FAULT CATEGORY

<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio	<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions	<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge	<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input checked="" type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other
---	---	---	--	--

# Certified Inspection Report

08/27/13  
00:25:11

Alcoa Inc.  
Massena Operations  
Park Avenue East, Massena, NY 13662



Customer **Copper Brass Sales** Customer P.O. No. **5400189486** Customer Part No. **(ALRD00373)** Alcoa Order No. **MMC-A8137- -070** Govt. Contract No.

Ship To **Copper Brass Sales**  
**800 Arlington Blvd. Suite**  
**Swedesboro, NJ 08085**

We hereby certify that the material covered in this report has been inspected in accordance with, and has been found to meet the applicable requirements described herein, including any specifications forming a part of the description, or as previously agreed to with customer and that samples representative of the material met the composition limits and have the mechanical properties shown on the face of this sheet. Manufactured under an ISO/TS 16949 registered quality management system. Melted and manufactured in the USA.

*James E. Samuel II*  
James E. Samuel II, Quality Assurance Manager

Date Shipped **08/16/13** Weight Shipped **1,964 lbs** Product **CFRB-CF ROD Specific Length** BOL **000161359**  
Alloy - Temper **7075-T7351** Size **3.50000 IN** Shape **DIA** Config **12 FT** QRR

## Specifications:

AMS 4124E  
ASTM B211-12E1  
Material conforms to T73 requirements  
Minimum mechanical properties to apply:  
68 KSI Tensile Strength  
56 KSI Yield Strength  
10% Elongation  
QQA-225/9E (Except Size)  
AMS-QQA-225/9 (Except Size)

Product produced and marked to the requirements of AMS-QQ-A-225/9 also meets the requirements of QQ-A-225/9.  
Product produced and marked to the requirements of QQ-A-225/9 also meets the requirements of AMS-QQ-A-225/9.

TEST REQUIREMENTS	Test	Test	Test	Test	Test	Test	Test	Test	Test	Test
	U.T.S.	T.Y.S.	%Elong	Cond						
Max:		67.9								
Min:	68.0	56.0	10.0	38.0						

Test Results	No. of Tests	Test	Test	Test	Test	Test	Test	Test	Test	Test
Lot / Work Order		U.T.S.	T.Y.S.	%Elong	Cond					
MA013004215	1	Max: 73.6	63.6	15.5	40.5					
		Min: 73.6	63.6	15.5	40.5					

## TEST ABBREVIATIONS

U.T.S. Ultimate Tensile Strength KSI  
Cond Conductivity % IACS

T.Y.S. Tensile Yield Strength KSI

%Elong Elongation % in 2"

## Aluminum Association Chemical Composition Limits (in Weight %)

ALLOY	MAX	%SI	%FE	%CU	%MN	%MG	%CR	%ZN	%TI	%Others	%Others	%AL			
7075	MIN	0.40	0.50	2.0	0.30	2.9	0.28	6.1	0.20	0.05	0.15	Rem			
				1.2		2.1	0.18	5.1		Each	Total				

## Actual Started Chemistry

LOT/WORK ORDER	MAX	%SI	%FE	%CU	%MN	%MG	%CR	%ZN	%TI	%OE	%OT	%AL			
MA013004215	MIN	0.06	0.15	1.7	0.03	2.6	0.20	6.0	0.02	LT 0.05	LT 0.15	Rem			
		0.05	0.14	1.6	0.03	2.5	0.19	5.8	0.02						

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402715926

CstAr

CstOr 252175

Wgt.: 244.213 LB

Date 09/25/2013

Page 1

*John R. Zambetti*



# Certified Inspection Report

08/17/13  
00:25:11

Alcoa Inc.  
Massena Operations  
Park Avenue East, Massena, NY 13662



Customer  
**Copper Brass Sales**

Customer P.O. No.  
**5400189486**

Customer Part No.  
**(ALRD00373)**

Alcoa Order No.  
**MMC-A8137-070**

Govt. Contract No.

## NOTES:

Mercury is not a normal contaminant in aluminum alloys and neither it nor any of its compounds are used in the manufacture of our product.  
This alloy meets the requirements of EU 2011/65/EC (RoHS) and EU 2000/53/EC for lead, mercury, cadmium and hexavalent chromium.

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402715926

CstAr

CstOr 252175

Wgt.: 244.213 LB

Date 09/25/2013

Page 2

A handwritten signature in black ink, reading "John L. Zambetti", enclosed within a rectangular border.



**COPPER AND BRASS SALES****MATERIAL TYPE****ALUMINIUM ALLOYS****PRODUCT DESIGNATION****2014 2024 2224 2324 7050 7075 7150 7175 7475 ALUMEC 89 ALUMEC 99 QC-7****"WARNING"**

SMALL CHIPS,FINE TURNINGS AND DUST MAY IGNITE READILY.EXPLOSION POTENTIAL MAY BE PRESENT WHEN:DUST OR FINES ARE DISPERSED IN THE AIR; FINE, DUST OR MOLTEN ALUMINUM ARE IN CONTACT WITH CERTAIN METAL OXIDES; OR,CHIPS,FINES,DUST OR MOLTEN ALUMINUM ARE IN CONTACT WITH WATER OR MOISTURE.KEEP AWAY FROM IGNITION SOURCE.USE EXPLOSION-PROOF VENTILATION.KEEP MATERIAL DRY.

THIS PRODUCT CONTAINS BERYLLIUM AND COPPER.INHALING BERYLLIUM DUST OR FUMES MAY CAUSE CHRONIC BERYLLIUM DISEASE (CBD),A SERIOUS CHRONIC LUNG DISEASE IN SOME INDIVIDUALS.BERYLLIUM IS A CANCER HAZARD;OVER TIME CBD AND CANCER CAN BE FATAL,TARGET ORGAN IS PRIMARILY THE LUNG.INHALING LARGE AMOUNTS OF COPPER,MAGNESIUM OXIDE,MANGANESE OXIDE,AND ZINC OXIDE FUMES OR DUST MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS.CHRONIC OVEREXPOSURE TO COPPER MAY CAUSE THICKENING OF THE SKIN;AND SKIN,TEETH,AND HAIR DISCOLORATION.CHRONIC OVEREXPOSURE TO MANGANESE DUST CAN CAUSE CENTRAL NERVOUS SYSTEM DAMAGE,SCARRING OF THE LUNGS AND REPRODUCTIVE HARM IN MALES.TARGET ORGAN IS PRIMARILY THE LUNG,BUT REPEATED HIGH EXPOSURE CAN ALSO AFFECT THE LIVER.CHRONIC OVEREXPOSURE TO IRON OXIDE DUST/FUME MAY CAUSE LUNG SIDEROSIS.CHRONIC OVEREXPOSURE TO SILICON DUST CAN CAUSE CHRONIC BRONCHITIS.OVEREXPOSURE TO AMORPHOUS SILICA CAN CAUSE DRYING OF THE MUCOUS MEMBRANES OF THE EYES,NOSE,AND THROAT.

THIS PRODUCT ALSO CONTAINS NICKEL AND CHROMIUM COMPOUNDS.INHALATION OF NICKEL DUST OR FUME MAY RESULT IN INFLAMMATION OF THE RESPIRATORY TRACT AND CAUSE NASAL AND/OR LUNG CANCER.NICKEL HAS BEEN IDENTIFIED AS A POTENTIAL HUMAN CARCINOGEN.EXPOSURE TO CHROMIUM DUST OR FUMES MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS AND KIDNEY AND LIVER DAMAGE.UNDER HIGH TEMPERATURES,HEXAVALENT CHROMIUM MAY BE PRODUCED,IF IN THE INSOLUBLE FORM,IT IS A CONFIRMED HUMAN CARCINOGEN.(CALIFORNIA PROPOSITION 65).

IF COATED WITH OIL,MAY CAUSE SKIN IRRITATION/DERMATITIS BY CONTACT.WELDING FUME IS LISTED AS A POSSIBLE CARCINOGENIC TO HUMANS.

READ THE ALUMINIUM/ALUMINIUM ALLOYS MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL.

\* If processing or recycling produces particulate,use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding,grinding,abrasive sawing,sanding and polishing.Any activity which abrades the surface of this material can generate airborne particulate.Use appropriate NIOSH approved respiratory protection (P95; P100 for lead with, quantitative fit testing required) if exposures exceed the permissible limits.

\* The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational exposures.

\* Aluminum, in solid form and as contained in finished products presents no special health risk.

\* Sold for manufacturing purposes only.This product can be recycled; contact your sales representative.

For additional information, call or write to Copper and Brass Sales,22355 West Eleven Mile Road, Southfield, MI 48033,telephone 248-233-5600, or visit our web site @ [www.copperandbrass.com](http://www.copperandbrass.com).

2



# CERTIFIED TEST REPORT

Constellium Rolled Products Ravenswood, LLC

COPPER & BRASS SALES  
1015 SAINT JEROME STREET  
MISHAWAKA IN  
46544

COPPER & BRASS SALES  
P.O. BOX 5116  
SOUTHFIELD MI  
48086

COPPER&BR T84303 4075 INCLUSION SERIAL#: 20130820T84303 PAGE 1 OF 3

CUSTOMER PURCHASE ORDER NO. & ITEM 5400189756				Constellium ORDER NO. 110-513235		<b>CERTIFICATION</b> "Constellium Rolled Products, hereby certifies that metal shipped under this order has been inspected and found in conformance with the requirements of the applicable specifications as indicated herein. Any warranty is limited to that shown on Constellium Rolled Products' standard General Terms and Conditions of Sales. Test reports are on file, subject to examination."  Constellium Rolled Products Ravenswood, LLC Rt 2 South Century Road P.O. BOX 68 RAVENSWOOD, WV 26164 USA  <i>Rodney J. Felty</i> Rodney J. Felty - Laboratory Manager	
ALLOY 7075	CLAD. 00	TEMPER T651	GAUGE 2.03000	WIDTH 60.500	LENGTH 144.500		
ITEM ORDERED MOLD PLATE-DIST GE SPEC PLATE, SAWED MILL							
CUSTOMER SPECIFICATION AMS-QQ-A-250/12							
PART NUMBER ALFLR00999		B/L NUMBER T84300		DATE SHIPPED 08/21/13			
WEIGHT SHIPPED 7,540		NO. OF PIECES 4		GOVT. CONTRACT NO.			

LOT NUMBER	TEST DIRECTION	NO. OF TESTS	ULTIMATE STRENGTH K.S.I.		YIELD STRENGTH K.S.I.		ELONGATION %		COND % IACS										
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN	MAX									
437541	LT	2	***** T651 80.1	80.8	68.7	69.6	***** 13.0	13.0											
All material contained in lot 437541 was cast and manufactured in the USA.																			
-----																			
ALL LOTS ON THIS CERTIFICATION ALSO CONFORM TO THE FOLLOWING REQUIREMENTS																			
-----																			
ASTM B209-10, AMS 4045K																			
CHEM COMP	ALLOY	SILICON		IRON		COPPER		MANGANESE		MAGNESIUM		CHROMIUM		ZINC		TITANIUM		OTHERS	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	EACH MAX.	TOT. MAX.
	SEE ACTUAL CHEMICAL COMPOSITION																		
ALUMINUM REMAINDER																			

P-860-155D (06/11)

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402716201

CstAr

CstOr 252175

Wgt.: 115.000 LB

Date 09/25/2013

*John L. Zambetti*



# CERTIFIED TEST REPORT

Constellium Rolled Products Ravenswood, LLC

COPPER & BRASS SALES  
1015 SAINT JEROME STREET  
MISHAWAKA IN

COPPER & BRASS SALES  
P.O. BOX 5116  
SOUTHFIELD MI

46544

48086

COPPER&BR T84303 4075 INCLUSION SERIAL#: 20130820T84303 PAGE 2 OF 3

CUSTOMER PURCHASE ORDER NO. & ITEM 5400189756				Constellium ORDER NO. 110-513235		CERTIFICATION	
ALLOY 7075	CLAD. 00	TEMPER T651	GAUGE 2.03000	WIDTH 60.500	LENGTH 144.500	<p>"Constellium Rolled Products, hereby certifies that metal shipped under this order has been inspected and found in conformance with the requirements of the applicable specifications as indicated herein. Any warranty is limited to that shown on Constellium Rolled Products' standard General Terms and Conditions of Sales. Test reports are on file, subject to examination."</p> <p>Constellium Rolled Products Ravenswood, LLC Rt 2 South, Century Road P.O. BOX 68 RAVENSWOOD, WV 26164 USA</p> <p><i>Rodney J. Felty</i> Rodney J. Felty - Laboratory Manager</p>	
ITEM ORDERED MOLD PLATE-DIST GE SPEC PLATE, SAWED MILL							
CUSTOMER SPECIFICATION AMS-QQ-A-250/12							
PART NUMBER ALFLR00999		B/L NUMBER T84300		DATE SHIPPED 08/21/13			
WEIGHT SHIPPED 7,540		NO. OF PIECES 4		GOVT. CONTRACT NO.			

LOT NUMBER	TEST DIRECTION	NO. OF TESTS	ULTIMATE STRENGTH K.S.I.		YIELD STRENGTH K.S.I.		ELONGATION %		COND % IACS										
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.									
437541	C		ACTUAL CHEMICAL COMPOSITION																
			SI= 0.08	FE= 0.16	CU= 1.42	MN= 0.04	MG= 2.48												
			CR= 0.21	ZN= 5.59	TI= 0.02	ZR= 0.01													
			OTHERS-EACH: .05 MAX. OTHERS TOTAL: .15 MAX. AL REMAINDER																
CHEM COM POS	ALLOY	SILICON		IRON		COPPER		MANGANESE		MAGNESIUM		CHROMIUM		ZINC		TITANIUM		OTHERS	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	EACH MAX.	TOTAL MAX.
		SEE ACTUAL CHEMICAL COMPOSITION																	
		ALUMINUM REMAINDER																	

P-860-155D (06/11)

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402716201

CstAr

CstOr 252175

Wgt.: 115.000 LB

Date 09/25/2013

*John L. Zambetti*







COPPER & BRASS SALES  
1015 SAINT JEROME STREET  
MISHAWAKA IN

46544



COPPER & BRASS SALES  
P.O. BOX 5116  
SOUTHFIELD MI

48086

# CERTIFIED TEST REPORT

Constellium Rolled Products Ravenswood, LLC

COPPER&BR T84303 4075 INCLUSION SERIAL#: 20130820T84303 PAGE 3 OF 3

CUSTOMER PURCHASE ORDER NO. & ITEM 5400189756				Constellium ORDER NO. 110-513235	
ALLOY 7075	CLAD 00	TEMPER T651	GUAGE 2.03000	WIDTH 60.500	LENGTH 144.500
ITEM ORDERED MOLD PLATE-DIST GE SPEC PLATE, SAWED MILL					
CUSTOMER SPECIFICATION AMS-QQ-A-250/12					
PART NUMBER ALFLR00999		BL NUMBER T84300		DATE SHIPPED 08/21/13	
WEIGHT SHIPPED 7,540		NO. OF PIECES 4		GOVT. CONTRACT NO.	

**CERTIFICATION**

"Constellium Rolled Products, hereby certifies that metal shipped under this order has been inspected and found in conformance with the requirements of the applicable specifications as indicated herein. Any warranty is limited to that shown on Constellium Rolled Products' standard General Terms and Conditions of Sales. Test reports are on file, subject to examination."

Constellium Rolled Products Ravenswood, LLC  
Rt 2 South, Century Road  
P.O. BOX 68  
RAVENSWOOD, WV 26164 USA

*Rodney J. Felty*  
Rodney J. Felty - Laboratory Manager

LOT NUMBER	TEST DIRECTION	NO. OF TESTS	ULTIMATE STRENGTH K.S.I.		YIELD STRENGTH K.S.I.		ELONGATION %		COND % IACS										
			MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.									
THIS TEST REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF THE LABORATORY OR AUTHORIZED QUALITY DELEGATE. THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THE CERTIFICATE MAY BE PUNISHED AS A FELONY UNDER FEDERAL LAW.																			
CHEMISTRY BY OES: ARKSPARK																			
CHEMISTRIES REPORTED IN PERCENTAGE BY WEIGHT.																			
WHEN FRACTURE TOUGHNESS TEST REQUIRED, TESTED PER ASTM E399.																			
WHEN TENSILE TEST REQUIRED, TESTED PER ASTM E8; B557.																			
Mark Paperwork: ALFLR00999																			
DUNS Number: 090570149; CAGE Code: 1YWL9																			
Mercury is not a normal contaminant in aluminum alloys and neither mercury nor any of its compounds were utilized in the manufacture of our product.																			
"END OF CERTIFICATION"																			
CHEM COMP	ALLOY	SILICON		IRON		COPPER		MANGANESE		MAGNESIUM		CHROMIUM		ZINC		TITANIUM		OTHERS	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	EACH MAX.	TOTAL MAX.		
	SEE ACTUAL CHEMICAL COMPOSITION																		
ALUMINUM REMAINDER																			

P-880-155D (06/11)

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402716201

CstAr

CstOr 252175

Wgt.: 115.000 LB

Date 09/25/2013

*John L. Zambetti*

FORM: 1006

WORKORDER:

2402716201

# COPPER AND BRASS SALES

MATERIAL TYPE

ALUMINIUM ALLOYS

PRODUCT DESIGNATION

2014 2024 2224 2324 7050 7075 7150 7175 7475 ALUMEC 89 ALUMEC 99 QC-7

## "WARNING"

SMALL CHIPS,FINE TURNINGS AND DUST MAY IGNITE READILY.EXPLOSION POTENTIAL MAY BE PRESENT WHEN:DUST OR FINES ARE DISPERSED IN THE AIR; FINE, DUST OR MOLTEN ALUMINUM ARE IN CONTACT WITH CERTAIN METAL OXIDES; OR,CHIPS,FINES,DUST OR MOLTEN ALUMINUM ARE IN CONTACT WITH WATER OR MOISTURE.KEEP AWAY FROM IGNITION SOURCE.USE EXPLOSION-PROOF VENTILATION.KEEP MATERIAL DRY.

THIS PRODUCT CONTAINS BERYLLIUM AND COPPER.INHALING BERYLLIUM DUST OR FUMES MAY CAUSE CHRONIC BERYLLIUM DISEASE (CBD),A SERIOUS CHRONIC LUNG DISEASE IN SOME INDIVIDUALS.BERYLLIUM IS A CANCER HAZARD;OVER TIME CBD AND CANCER CAN BE FATAL,TARGET ORGAN IS PRIMARILY THE LUNG.INHALING LARGE AMOUNTS OF COPPER,MAGNESIUM OXIDE,MANGANESE OXIDE,AND ZINC OXIDE FUMES OR DUST MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS.CHRONIC OVEREXPOSURE TO COPPER MAY CAUSE THICKENING OF THE SKIN;AND SKIN,TEETH,AND HAIR DISCOLORATION.CHRONIC OVEREXPOSURE TO MANGANESE DUST CAN CAUSE CENTRAL NERVOUS SYSTEM DAMAGE,SCARRING OF THE LUNGS AND REPRODUCTIVE HARM IN MALES.TARGET ORGAN IS PRIMARILY THE LUNG,BUT REPEATED HIGH EXPOSURE CAN ALSO AFFECT THE LIVER.CHRONIC OVEREXPOSURE TO IRON OXIDE DUST/FUME MAY CAUSE LUNG SIDEROSIS.CHRONIC OVEREXPOSURE TO SILICON DUST CAN CAUSE CHRONIC BRONCHITIS.OVEREXPOSURE TO AMORPHOUS SILICA CAN CAUSE DRYING OF THE MUCOUS MEMBRANES OF THE EYES,NOSE,AND THROAT.

THIS PRODUCT ALSO CONTAINS NICKEL AND CHROMIUM COMPOUNDS.INHALATION OF NICKEL DUST OR FUME MAY RESULT IN INFLAMMATION OF THE RESPIRATORY TRACT AND CAUSE NASAL AND/OR LUNG CANCER.NICKEL HAS BEEN IDENTIFIED AS A POTENTIAL HUMAN CARCINOGEN.EXPOSURE TO CHROMIUM DUST OR FUMES MAY CAUSE METAL FUME FEVER WITH FLU-LIKE SYMPTOMS AND KIDNEY AND LIVER DAMAGE.UNDER HIGH TEMPERATURES,HEXAVALENT CHROMIUM MAY BE PRODUCED,IF IN THE INSOLUBLE FORM,IT IS A CONFIRMED HUMAN CARCINOGEN.(CALIFORNIA PROPOSITION 65).

IF COATED WITH OIL,MAY CAUSE SKIN IRRITATION/DERMATITIS BY CONTACT.WELDING FUME IS LISTED AS A POSSIBLE CARCINOGENIC TO HUMANS.

READ THE ALUMINIUM/ALUMINIUM ALLOYS MATERIAL SAFETY DATA SHEET (MSDS) ON FILE WITH YOUR EMPLOYER BEFORE WORKING WITH THIS MATERIAL.

\* If processing or recycling produces particulate,use exhaust ventilation or other controls designed to prevent exposure to workers. Examples of such activities include melting, welding,grinding,abrasive sawing,sanding and polishing.Any activity which abrades the surface of this material can generate airborne particulate.Use appropriate NIOSH approved respiratory protection (P95; P100 for lead with, quantitative fit testing required) if exposures exceed the permissible limits.

\* The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational exposures.

\* Aluminum, in solid form and as contained in finished products presents no special health risk.

\* Sold for manufacturing purposes only.This product can be recycled; contact your sales representative.

For additional information, call or write to Copper and Brass Sales,22355 West Eleven Mile Road, Southfield, MI 48033,telephone 248-233-5600, or visit our web site @ [www.copperandbrass.com](http://www.copperandbrass.com).

ALUMINUM LABEL NO. 300-1056

ISSUED 10/01/2008

**VALBRUNA**SLATER STAINLESS, INC.  
2400 TAYLOR STREET WEST - PO BOX 630  
FORT WAYNE IN 46802 USA  
PHONE 260.434.2800 - FAX 260.434.2801**Product Certification Report**Report Number: **4915460**

Certified on Sep 13, 2013 Page 1 of 2

Order LD. <b>1302074 002</b>		Order Date <b>8/29/13</b>		Commodity Code <b>SSRD00137</b>	
Dim 1 <b>6.5000</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I.D. <b>425963</b>	Customer I.D. <b>002558</b>	Customer Purchase Order <b>5400195734-TX</b>
Product Shape <b>Rounds</b>			Product Surface <b>HR &amp; Rough Turned</b>		Customer Grade <b>630</b>
Length (Inches) <b>120.000 Min. 168.000 Max.</b>			BB of Lading # <b>420150</b>	Weight	

**Ship To****COPPER AND BRASS SALES  
12321 Cutten Road  
HOUSTON, TX 77041****Sold To****VALBRUNA STAINLESS, INC.  
2400 TAYLOR STREET WEST  
FORT WAYNE, IN 46802****Lifts: 0030 0031**

AISI 630

Condition A

ASTM F899-12b

ASTMA 564-13

ASMESA 564 10 ED 2011a add.

AMS 2303F

**AMS 5643S (except finish)****CHEMICAL ANALYSIS**

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	N	Co	Ta	Co+Ta
.035	.70	.028	.022	.45	15.97	4.40	.26	3.32	.03	.26	.000	.259

**BRINELL HARDNESS ASTM E10-12**

HBW

358

**TENSILE PROPERTIES ASTM E8-13a****CAPABILITY**

Cap HB	TS (PSI)	.2%YS (PSI)	%EL(4d)	%RA	AGE(F)
403	194600	171000	18.1	48.5	900

**MAGNETIC PARTICLE TEST AMS2303**

FREQ SEV

AVG .00 .00

**PRODUCTION HEAT TREATMENT**

SOL-ANN(F)	SOL-ANN(HR)	QUENCH
1900	10.00	Air

**MACRO ASTM E340-00/E381-01**

MACRO

OK

OK

OK

**PERCENT FERRITE (AMS 2315)**

% FERRITE Etchant Magnification X

AVG 2.0 Marbles 100

Free of mercury and low melting alloy contamination.

MAXX stainless.

Electric Furnace melted; AOD refined.

Reduction ratio exceeds 5 To 1.

Material is RoHS compliant.

Chemical testing to one or more of the listed ASTM methods:

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes. Including Federal law Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*

Email: DHackett@valbruna.us

Dennis Hackett

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402716134

CstAr

CstOr 252175

Wgt.: 410.000 LB

Date 09/30/2013

*John L. Zambetti*



**VALBRUNA****SLATER STAINLESS, INC.**2400 TAYLOR STREET WEST - PO BOX 630  
FORT WAYNE IN 46802 USA  
PHONE 260.434.2500 - FAX 260.434.2801**Product Certification Report****Report Number: 4915460****Certified on Sep 13, 2013 Page 2 of 2**

Order I.D. <b>1302074 002</b>		Order Date <b>8/29/13</b>		Commodity Code <b>SSRD00137</b>	
Dim 1 <b>6.5000</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I.D. <b>425963</b>	Customer I.D. <b>002558</b>	Customer Purchase Order <b>5400195734-TX</b>
Product Shape <b>Rounds</b>			Product Surface <b>HR &amp; Rough Turned</b>		Customer Grade <b>630</b>
Length (Inches) <b>120.000 Min. 168.000 Max.</b>			Bill of Lading # <b>420150</b>	Weight	

**Ship  
To****COPPER AND BRASS SALES  
12321 Cutten Road  
HOUSTON, TX 77041****Sold  
To****VALBRUNA STAINLESS, INC.  
2400 TAYLOR STREET WEST  
FORT WAYNE, IN 46802***conf 13/10/13*

E415-08, E572-02a, E1019-11, E1085-95, E1086-08.  
 Location of tensile fracture: inside middle of gage length.  
 Chemical Analysis performed at Acciaierie Valbruna, Italy.  
 No mercury or low melting alloy contamination. No weld repair.  
 Material melted in Italy, manufactured in the United States.  
 Material conforms to listed specifications and is DFARS compliant.  
 Quality system is compliant with ISO 9001:2008. Produced in accordance with EN 10204 3.1.

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes. Including Federal law Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*

email: DHackett@valbruna.us

Dennis Hackett

From: ThyssenKrupp Materials NA

Cust. THYSSENKRUPP MATERIALS NA - ECAD Del.: 2402716134

CstAr

CstOr 252175

Wgt.: 410.000 LB

Date 09/30/2013

*John L. Zambetti*

Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID PO21461

Purchase Order Date 9/23/2013

PO Print Date 9/24/2013

Page Number 2 of 2

Order From : VC-COP001  
THYSSENKRUPP MATERIALS CA LTD  
O/A VPK METAL- C/O T27540/PO BOX 4275,POSTAL"A"  
TORONTO, ON M5W 5V8  
CA

Ship To : DART AEROSPACE LTD  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

Contact Name  
Vendor Phone 905 669 9444

Ship To Contact  
Ship To Phone  
Ship Via: Yours ppd  
Ship Acct:

Buyer  
Customer POID  
Customer Tax # 10127-2607  
Terms Net 30  
Currency CAD  
FOB FCA - (Free Carrier)

3 D6104-011P

17-4 SS Roundbar 6.50"Od

9/30/2013

Yes

9/30/2013

10.00

Each

\$136.00

\$1,360.00

AS PER DWG D6104 REV. B  
B106719

Line Total:

\$1,360.0

PO Total:

\$3,027.7

Note: Pricing listed above is as per contract agreement between Dart Aerospace and the respective manufacturer.  
No substitution or deviation without consent.  
Certificate of Conformity or Material Certification required **YES** NO  
PST# 6122-5207

Change Nbr:

2

Change Date: 9/24/2013